

## Note

# Length-weight relationship of five species of rays from Mumbai, Maharashtra

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## ABSTRACT

The length-weight relationship of five species of rays revealed no significant difference between males and females. Hence, regression equation for each species was calculated as : *Dasyatis uarnak*:  $\text{Log } W = -7.73348 + 2.54483 \text{ Log } L$ , *D. sephen*:  $\text{Log } W = -8.09534 + 2.62806 \text{ Log } L$ , *Trygon walga*:  $\text{Log } W = -7.47977 + 2.48397 \text{ Log } L$ , *Gymnura micrura*:  $\text{Log } W = -9.91272 + 2.73408 \text{ Log } L$  and *Rhinoptera javanica*:  $\text{Log } W = -9.24263 + 2.67815 \text{ Log } L$ .

No attempt has been made to study the length-weight relationship of different species of rays from Indian region except by Devadoss (1983-'94). Hence, five species of rays viz: *Dasyatis uarnak*, *D. sephen* (Forsskal), *Trygon walga* (Muller and Henle), *Gymnura micrura* (Sehneider) and *Rhinoptera javanica* (Muller and Henle) from Mumbai were selected for the study and the results are presented.

Data were collected from the commercial trawlers operating from New Ferry Wharf landing centre during February 1990 to September 1998. Data on length (across the disc) in cm and weight in kg were recorded separately for males and females in fresh condition at the time of unloading the catch. The length-weight relationship was calculated by method of least square using the equation:

$$\text{Log } W = \text{Log } a + b \text{ Log } L$$

where  $W$  = weight in kg,  $L$  = length in cm, and 'a' and 'b' constants. The

significance of difference between the regression coefficients of the sexes in each species was tested by analysis of covariance (Snedecor and Cochran, 1967).

The results of the study are included in Table 1 and 2.

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TABLE 1. Details of length-weight relationship in rays off Mumbai

Species	Number examined	Length range (cm)	Weight range (kg)	'a' value	'b' value	Significance	R2
<i>D. uarnak</i>							
Males	376	18.5- 84.0	0.22 -12.00	-7.58517	2.52025	NS	0.906963
Females	434	10.6- 106.0	0.05-20.00	-7.84529	2.56310		0.950931
Pooled	810	10.6-106.0	0.05 - 20.00	-7.73348	2.54483		0.933885
<i>D. sephen</i>							
Males	101	22.5-64.0	0.25 - 09.00	-7.20611	2.47235	NS	0.891304
Females	136	22.0-82.0	0.40-22.00	-8.10688	2.63611		0.969770
Pooled	237	22.0-82.0	0.25-22.00	-8.09534	2.62806		0.946560
<i>I. walga</i>							
Males	133	18.5-34.2	0.14-1.30	-6.46786	2.30113	NS	0.810241
Females	84	20.0-39.5	0.25-1.60	-7.61462	2.51247		0.883717
Pooled	217	18.5-39.5	0.14-1.60	-7.47977	2.48397		0.868218
<i>G. micrura</i>							
Males	70	23.1- 96.0	0.41-15.00	-9.74148	2.70749	NS	0.918512
Females	126	26.5-106.0	0.25 -14.00	-10.02886	2.75130		0.941481
Pooled	196	23.1-106.0	0.25 -15.00	-9.91272	2.73408		0.945500
<i>R. javanica</i>							
Males	26	26.5-116.0	0.65-17.00	-9.52426	2.715651	NS	0.915304
Females	32	22.0-104.0	0.24 -14.50	-8.87356	2.625208		0.766842
Pooled	58	22.0-116.0	0.24-17.00	-9.24263	2.678153		0.811824

TABLE 2. Analysis of Covariance for testing length - weight relationship of males and females of D. uarnak and D. sephen

Source of variations	DF	b'value	DF	SS	MS	F' value	Remarks
<b>Species: <i>D. uarnak</i></b>							
Males	375	2.5202	374	24.513	0.06554		
Females	433	2.5631	432	20.391	0.04720		
Total			806	44.904	0.05571		
Pooled (within)	808	2.547	807	44.925	0.05567		
Difference between slopes			1	0.020	0.02040	0.37	NS
Common	809	2.5448	808	44.981	0.05567		
Between corrected means			1	0.056	0.05603	1.01	NS
<b>Species: <i>D. sephen</i></b>							
Males	100	2.4723	99	13.914	0.14055		
Females	135	2.6361	134	6.013	0.04488		
Total			233	19.927	0.08553		
Pooled (within)	235	2.572	234	20.071	0.08577		
Difference between slopes			1	0.144	0.14352	1.68	NS
Common	236	2.628	235	20.628	0.08778		
Between corrected means			1	0.557	0.55721	6.50	NS

TABLE 3. Analysis of Covariance for testing length • weight relationship of males and females of *I. walga*, *G. micrura* and *R. javanica*

Source of variations	DF	b'value	DF	SS	MS	F Value	Remarks
<b>Species: <i>I. walga</i></b>							
Males	132	2.3011	131	3.888	0.02968		
Females	83	2.5124	82	2.957	0.03607		
Total			213	6.845	0.03214		
Pooled (within)	215	2.416	214	6.880	0.03215		
Difference between slopes			1	0.034	0.03406	1.06	NS
Common	216	2.4839	215	7.003	0.03257		
Between corrected means			1	0.123	0.12303	3.83	NS
<b>Species: <i>G. micrura</i></b>							
Males	69	2.7075	68	8.738	0.12851		
Females	125	2.7513	124	21.284	0.17165		
Total			192	30.023	0.15637		
Pooled (within)	194	2.741	193	30.032	0.15561		
Difference between slopes			1	0.010	0.00954	0.06	NS
Common	216	195	2.7341	194	30.04200	0.15485	
Between corrected means			1	0.009	0.00925	0.06	NS
<b>Species: <i>R. javanica</i></b>							
Males	25	2.7156	24	1.61	0.06709		
Females	31	2.6252	30	12.808	0.42694		
Total			54	14.419	0.26670		
Pooled (within)	56	2.6781	55	14.451	0.26275		
Difference between slopes			1	0.033	0.03270	0.1226	NS
Common	57	2.6782	56	14.613	0.26095		
Between corrected means			1	0.162	0.16196	0.6164	NS

## References

- Devadoss, P. 1983-'94. Further observations on the biology of the sting ray, *Dasyatis imbricatus* (Schneider) at Porto. Novo. *Matsya*, 9 & 10 : 129-134.
- Snedecor, G.W and W.G. Cochran 1967. *Statistical Methods*. Sixth Edition, Oxford and IBH Publishing Co., New Delhi, 593pp.